

# McLEOD & HENRY CO.

Flat Suspended Furnace Arches  
Complete Boiler Settings  
Sprung Furnace Arches  
Boiler-door Arches  
Boiler Baffle Tile  
Fire-box Lining

ESTABLISHED 1825  
ORIGINATORS OF STEEL MIXTURE

MAIN OFFICE AND WORKS, TROY, N. Y.  
BRANCHES: NEW YORK, BOSTON AND DETROIT

Back-Combustion-Chamber Arches  
Blow-off-Pipe Protectors  
High-Temperature Cement  
Special Fire Blocks  
Standard Fire Brick  
Fire Clay

## STEEL MIXTURE

Bulletin 157

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### THE FOOTE BACK-COMBUSTION-CHAMBER ARCH FOR HORIZONTAL RETURN-TUBULAR BOILERS

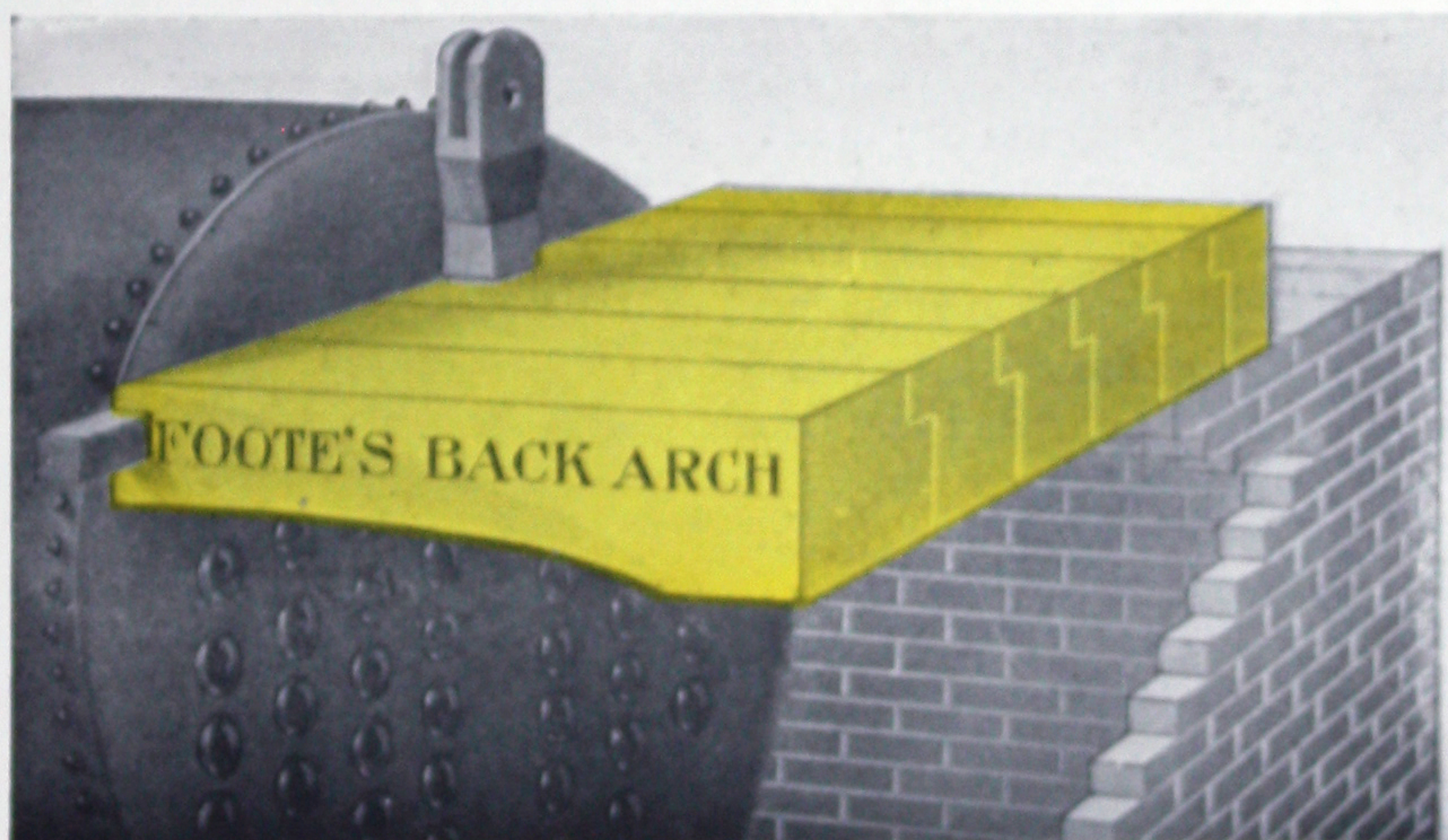


Fig. 1. The Foote Arch in place and ready for bricking in.

THE Foote Arch protects the flue sheet of the boiler down to and below the water line and is suitable for boilers of any size. It can be erected complete in an hour, is gas tight, and has plenty of room underneath for working with the tubes. Once properly installed, it remains thoroughly serviceable for the life of the boiler, but if dismantling ever becomes necessary in rebuilding adjacent brickwork, the arch can be taken down and reassembled without damage.

The arch is formed by a row of similar STEEL MIXTURE blocks shiplapped and cemented together to completely cover the back

combustion chamber, and curved on the under surfaces to deflect the gases toward the flues. The rear end of each block rests on the rear boiler wall and the front end is grooved to fit over and hang upon a 2-in. square iron bar which rests upon the side boiler walls. The front end of arches over 6 ft. wide is further supported at the center by overhead suspension connected to one or two clevises extending upward from and made integral with the iron bar.

No actual contact exists between the rear boiler head and the front end of the arch but the space between is sealed with an elastic



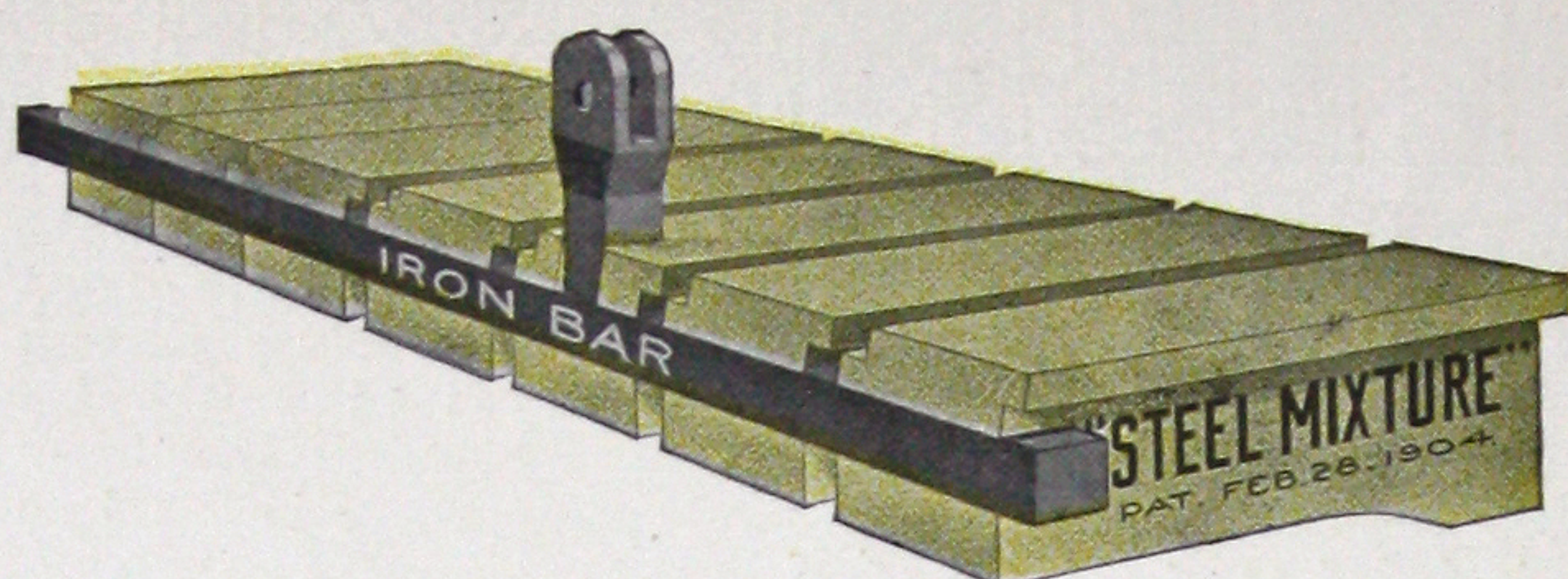


Fig. 2. Foote Arch loosely assembled to show method of interlocking the blocks and inserting the bar support at front.

cushion of asbestos wool, which permits free expansion and contraction of the boiler shell without effect upon the arch.

The bar is well protected from overheating and distortion, inasmuch as it is covered in front by the asbestos, and at the top, bottom and back by the arch blocks, the latter separating the lower side of the bar from the gases by a  $2\frac{1}{2}$ -in. thickness of vitrified fire clay.

The blocks for the Foote Arch are 6-in. wide with 1-in. by 1-in. shiplap, and are made in suitable lengths for any combustion chamber depth from 18-in. to 40-in. The front end of each block is  $7\frac{3}{4}$ -in. and the rear end  $9\frac{1}{2}$ -in. thick. The material from which these blocks are made is carefully vitrified to form accurate units of high crushing strength, with surfaces peculiarly free from cracking, checking, spalling and tendency to fuse under the highest temperatures.

**Installation:** The material furnished includes, (1) STEEL MIXTURE Blocks to cover the combustion chamber, (2) Iron supporting bar with integral clevis arms, if these are needed, and (3) Sufficient asbestos to form the cushion between the rear boiler head and the arch front.

The back and side boiler walls should be built up to the height indicated in Fig. 3A and the iron bar then set so that it is about  $1\frac{1}{4}$ -in. from the rear boiler head and  $3\frac{1}{2}$ -in. above the top row of tubes. The clevis arm or arms (on 6-ft. and longer bars only) are set vertical, centered, and connected by rods or other convenient means, to overhead beam or support. The blocks notched for the clevis are set first (Fig. 3B) and others added on each side until the combustion chamber is covered. To assure gas tightness, each block is set as tightly as possible against its neigh-

bor, after floating a thin mixture of ground fire clay on the shiplap. The front ends of the blocks should be  $\frac{5}{8}$ -in. away from the rear boiler head for boilers 4-ft. to 6-ft. in diameter, and  $\frac{7}{8}$ -in. away for boilers 6-ft. to 10-ft. in diameter.

After all the blocks are placed (Fig. 3C), the walls are built up to enclose the sides and rear. The space between the front end of the arch and the boiler head is then loosely packed with the asbestos wool and covered with enough fire-clay cement to hold the asbestos in place.

**Dimensions required:** Inquiries or orders should be accompanied by the following data in inches:

Diameter of boiler or distance between inside side wall surfaces.

Distance from inside back wall surface to back head of boiler.

If a manhole exists in rear boiler head, state width and distance between top row of tubes and bottom of manhole.

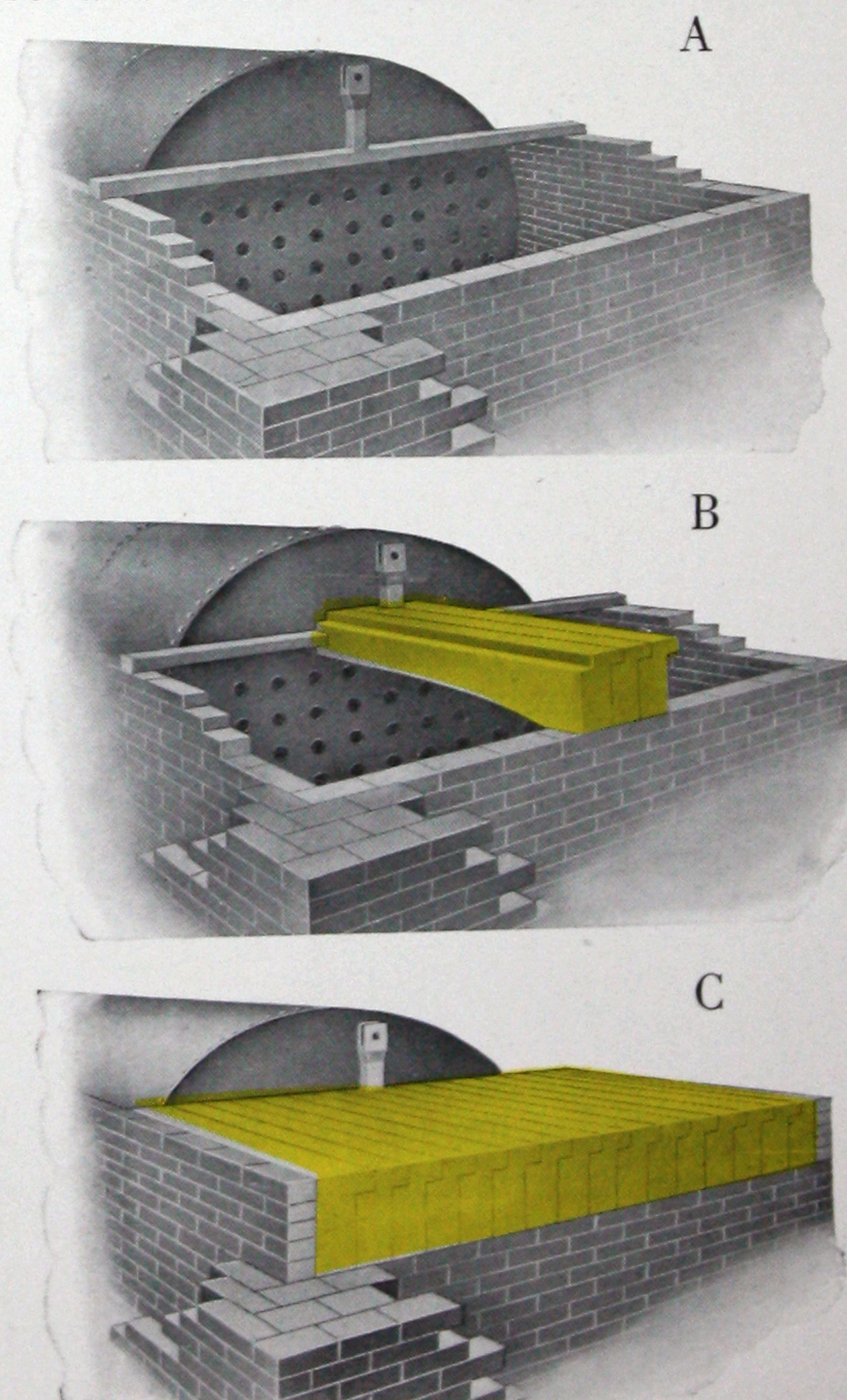


Fig. 3. Method of installing the Foote Arch.



## THE VINES BACK-COMBUSTION-CHAMBER ARCH FOR HORIZONTAL RETURN TUBULAR BOILERS

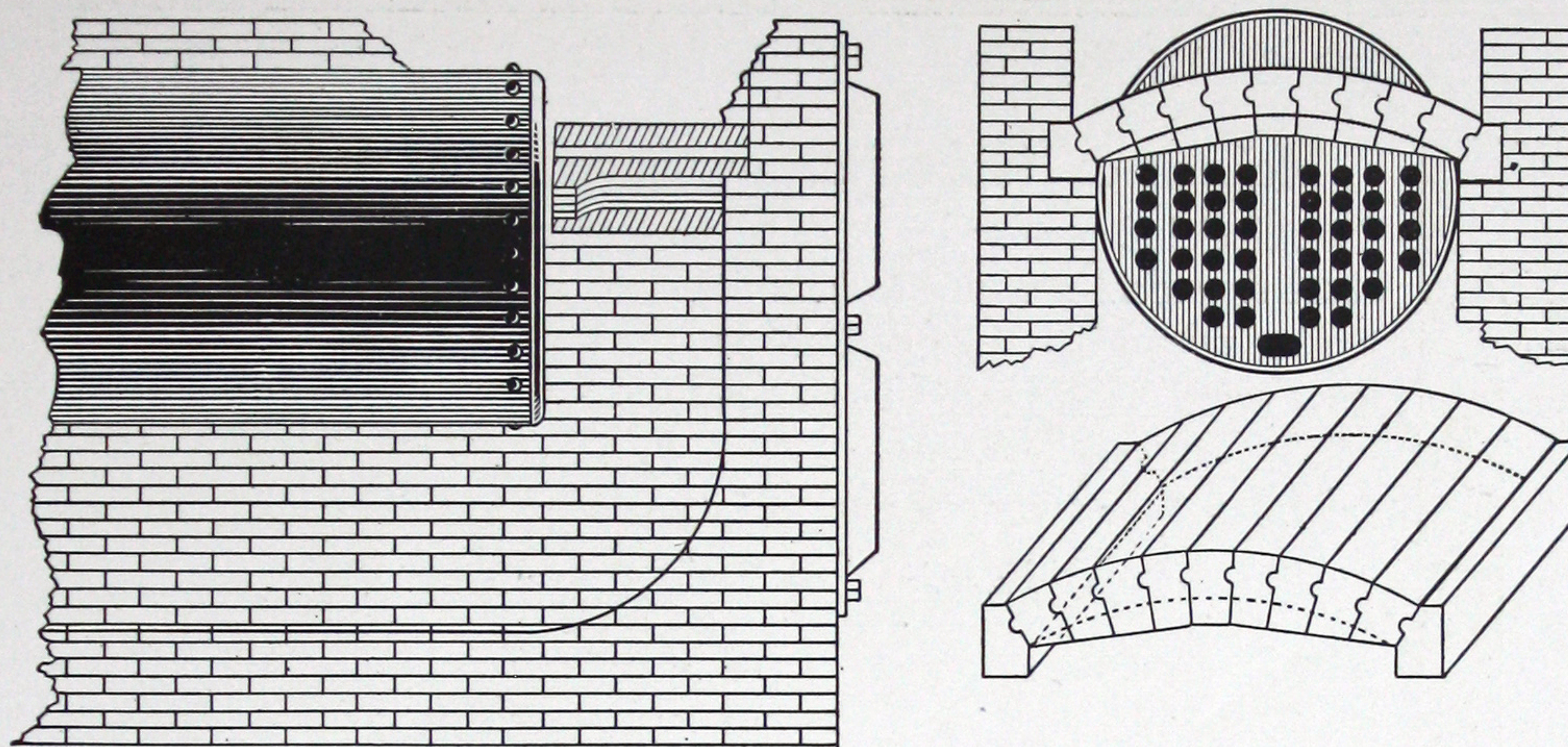


Fig. 4. Typical installation of the Vines Arch

**T**HIS arch protects the crown sheet of the boiler down to and below the water line.

It is composed of wedge-shaped STEEL MIXTURE fire clay blocks, tongued and grooved together to give a radius of 6-ft. 4-in. to the combustion chamber crown surface. Special end blocks which are built into the boiler side walls give ample support, as the rise is sufficient to hold up the center.

This arch is easily built into place over a temporary wooden form, and should be set with front ends of the blocks from  $\frac{5}{8}$ -in. to 1-in. away from the rear boiler head, depending upon the size of the boiler. The front ends of the blocks are beveled back to a V-shaped slot between the front end of the arch and the rear boiler head. This slot is packed with asbestos wool or other soft ma-

terial to form a gastight cushion which permits free expansion and contraction of the boiler shell without stress upon the arch.

The completed arch may be bricked over in the old way, but this is unnecessary as a thin coating of magnesia and asbestos mortar gives all the insulation and protection needed.

**Data required with orders:** Inquiries or orders should be accompanied by the following data in inches:

Distance between inside surfaces of side boiler walls.

Distance between rear boiler head and inside surface of back boiler wall.

If there is a manhole in the rear boiler head, state height and width and distance between manhole bottom and the top of top row tubes.

Complete or partial refractory material for all boilers,  
 metallurgical furnaces, ovens, etc.

**A**LMOST a century of specialization in boiler furnace problems has given us an endless amount of experience and data on which to base our recommendations and assure correct performance.

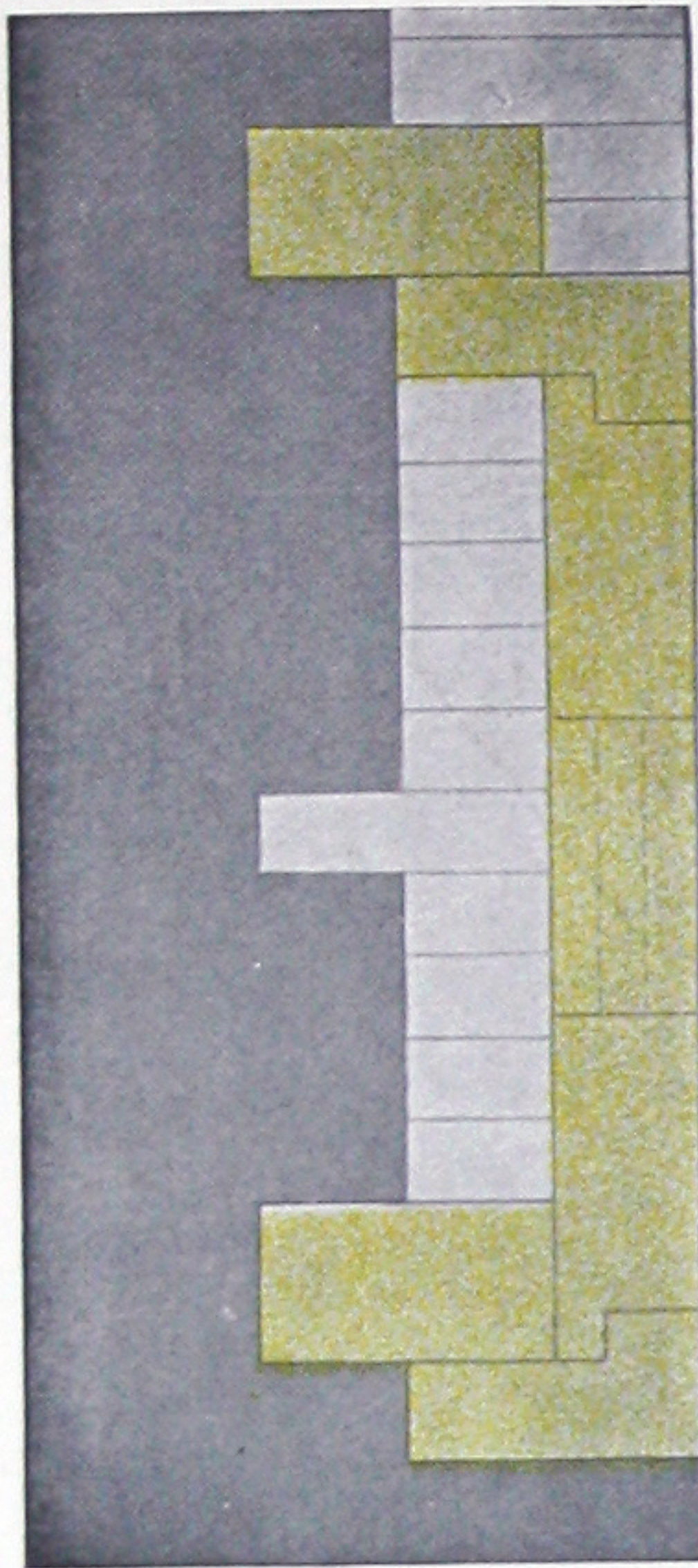
All engineering service in connection with

design is included without extra charge, and in order that the customer may get the most from his investment we consider it a duty as well as a pleasure to extend our co-operation throughout the life of the installation.



# MCLEOD & HENRY CO.

## Some of the other STEEL MIXTURE Products



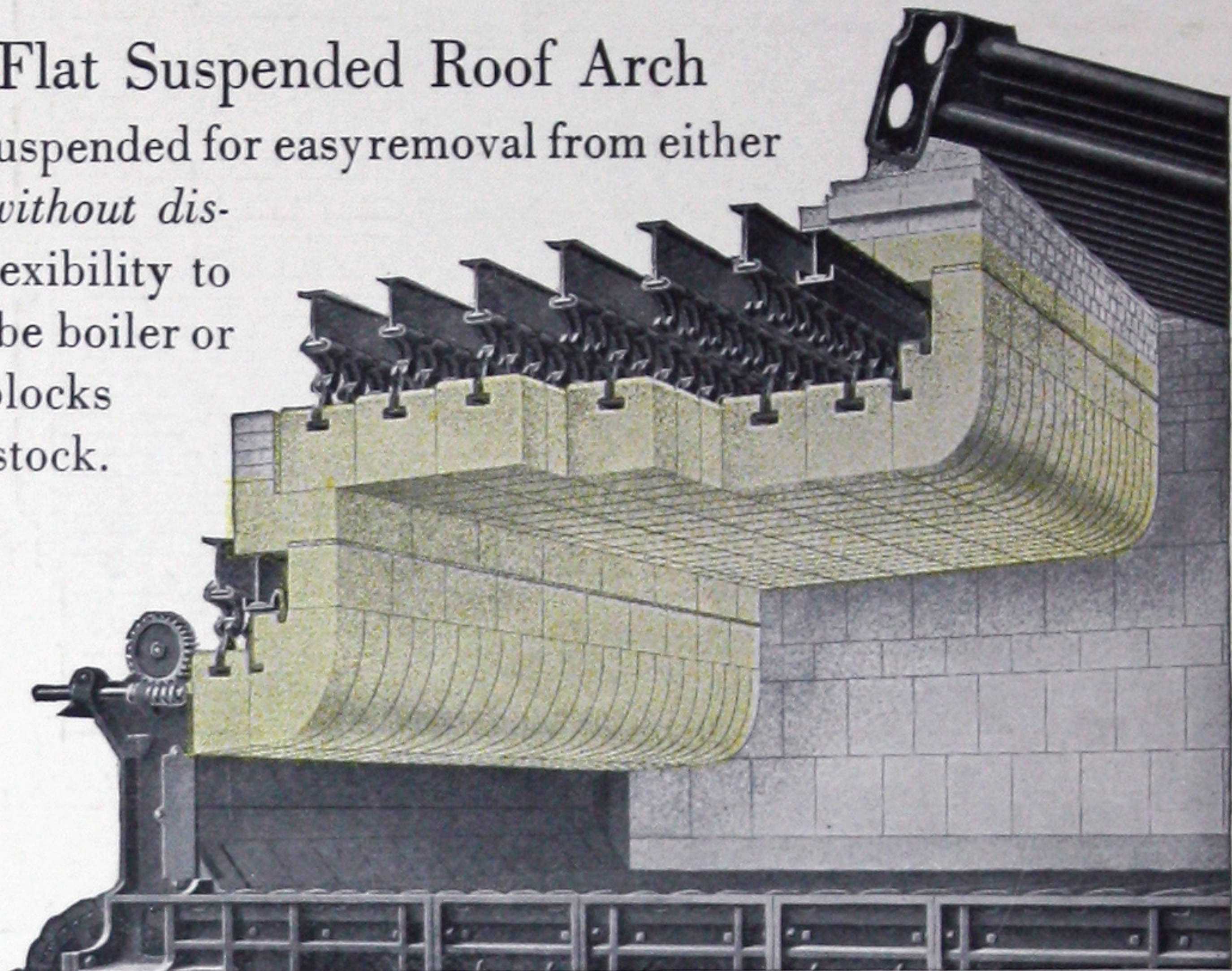
### McLeod & Henry Flat Suspended Roof Arch

Each block independently suspended for easy removal from either *above or underneath* and *without disturbing others*. Design flexibility to meet needs of any water-tube boiler or topped furnace. Renewal blocks quickly obtainable from stock.

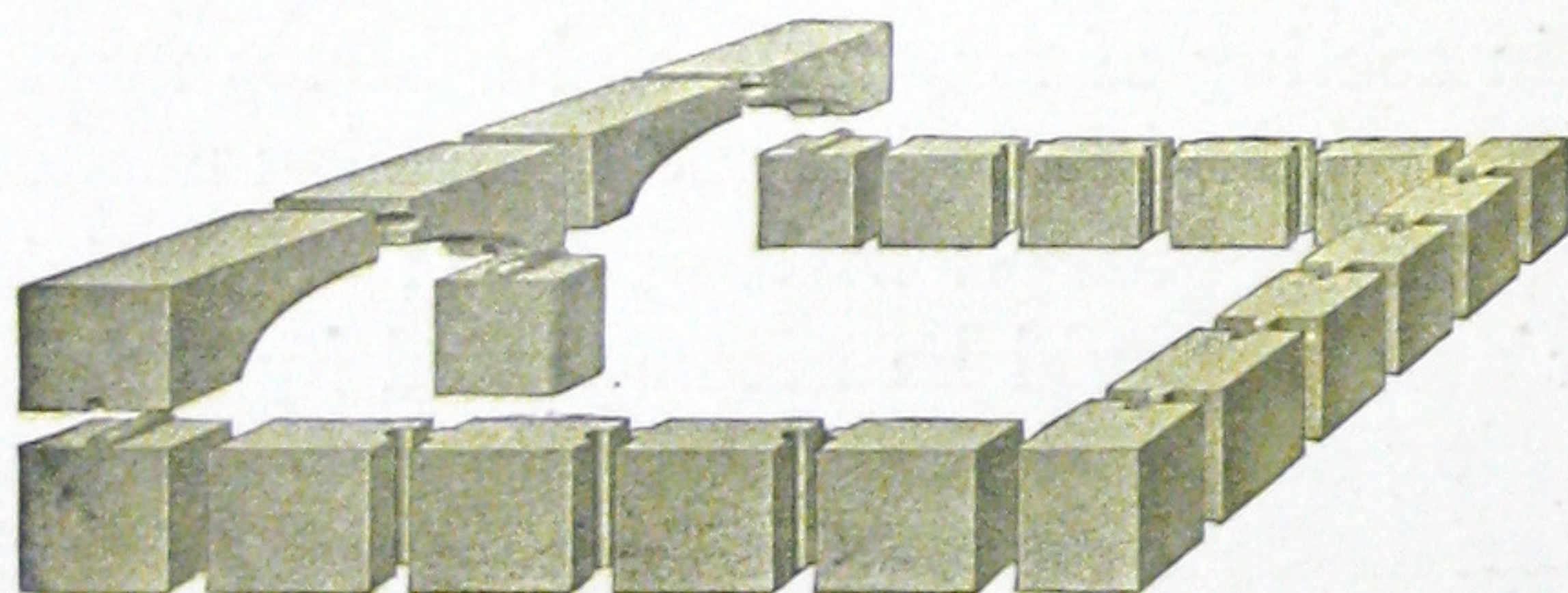
### Veneer Furnace Lining

Extends inward for only part of the thickness of the fire wall, the rest of which can be built from standard fire brick.

The fire wall, which gets least punishment, is built from cheaper material and becomes permanent, while the exposed portion can be renewed with less physical effort and with less expense for new material.

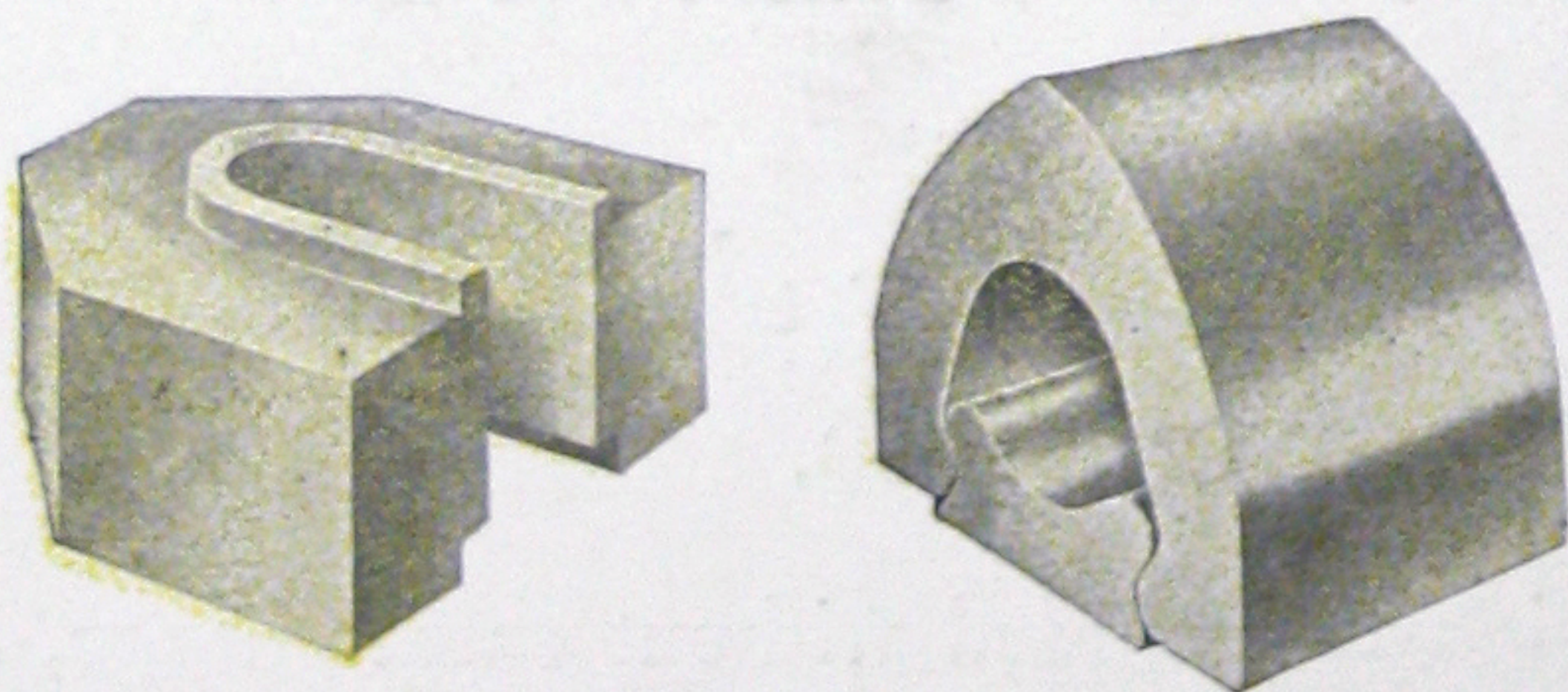


### Boiler-Door Arches and Fire-Box Blocks

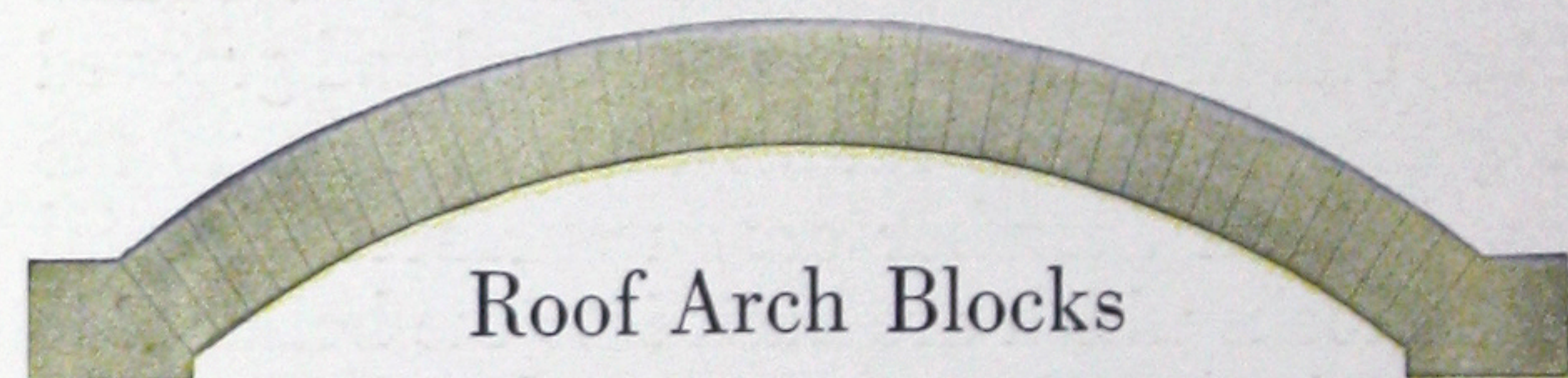


The strongest construction that can be put into a boiler. Saves time and labor in erecting and greatly lessens the number of joint corners and edges in the fire surface. Lasts twice as long as small brick. Sizes for any number and size of door openings.

### Blow-Off-Pipe Protection (h. r. t. boilers)



Fitted to or removed from pipe quickly. Better than masonry piers. Pipe is accessible for inspection.



### Roof Arch Blocks

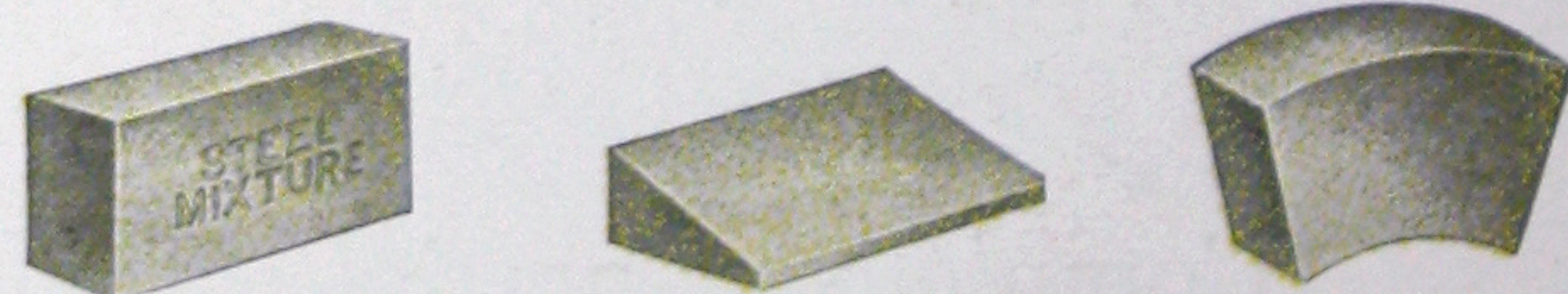
Complete with skew-backs. Any radius from 4 to 10 ft.

### Baffle Tile



Shapes and sizes for all popular makes of boilers.

### Fire Brick and Special Blocks



All desirable standard shapes in stock, and specials made for any purpose.

### High-Temperature Cement

A bonding material and filler for laying and general repair work on furnace refractories. Air-sets without heat, and will stand high temperatures.

Where desired, we submit design and furnish refractory material for the complete boiler or furnace setting.

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CCA